*Micrometrical Measures of Double Stars (Fourth Series).* By the Rev. T. E. Espin.

The stars measured in 1906 have been mainly those of *h*. In the list of these measures which is here given an asterisk against the number of the star denotes that the object observed is not exactly in the place given by *h*, and the difference is then given in the notes. The following stars I have not so far succeeded in identifying:—

| | | h | m | s | | | |
|---|---|---|---|---|---|---|---|
| *h* 5455 | *h*'s place | 2 | 49·14 | N.P.D. | 58°·10′ (1830) | 1906 | Nov. 13 |
| *h* 339 | | 3 | 49·15 | | 58·10 | 1906 | Nov. 30 |
| *h* 340 | | 3 | 56· 7 | | 58· 0 | 1906 | Nov. 30 |
| *h* 2593 | | 11 | 51·54 | | 49·10 | 1906 | April 10, 21 |
| *h* 2670 | | 13 | 32·50 | | 56·16 | 1906 | April 9, 10 |
| *h* 995 | | 23 | 49·26 | | 62·17 | 1906 | Oct. 13, 16 |

| *h*. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|
| 5450 | 0 6·7 | +35 35 | 232·6 | 4·75 | 9·1, 13·0 | 6·87 | 2 |
| 622 | 0 20·6 | +34 14 | 131·3 | 18·22 | 9·0, 9·0 | 4·78 | 2 |
| 1032 | 0 26·7 | +28 58 | 246·3 | 12·29 | 8·3, 9·0 | 6·80 | 2 |
| 625 | 0 30·4 | +39 43 | 282·9 | 14·38 | 8·9, 14·0 | 6·71 | 2 |
| 629 | 0 50·1 | +34 1 | 69·3 | 10·38 | 8·5, 11·5 | 6·86 | 2 BC |
| | | | 74·3 | 71·26 | A= 8·5 | 6·86 | 2 AB |
| 631 | 1 59·5 | +27 27 | 156·9 | 21·92 | 8·8, 11·0 | 6·90 | 2 |
| 636 | 1 8·8 | +30 0 | 287·5 | 20·57 | 7·7, 11·0 | 6·84 | 3 |
| 1078 | 1 18·9 | +27 3 | 89·8 | 15·18 | 8·5, 11·5 | 6·87 | 2 AB |
| | | | 89·7 | 28·34 | C= 10·0 | 6·87 | 2 AC |
| 653 | 2 27·6 | +30 58 | 40·9 | 22·99 | 7·8, 11·7 | 6·85 | 2 |
| 328 | 2 35·9 | +36 3 | 245·5 | 13·07 | 9·5, 11·0 | 6·47 | 2 |
| 329 | 2 47·9 | +31 18 | 106·0 | 35·41 | 8·0, 13·5 | 6·86 | 1 |
| 336 | 3 36·4 | +32 37 | 316·2 | 31·68 | 8·0, 11·0 | 6·92 | 2 (Σ 432 rej.) |
| 670 | 3 56·4 | +31 53 | 226·8 | 10·50 | 9·5, 9·5 | 6·92 | 2 |
| 349 | 4 41·1 | +34 35 | 85·6 | 9·87 | 9·1, 9·5 | 4·98 | 2 |
| 350 | 4 44·6 | +34 37 | 308·1 | 5·50 | 10·7, 10·7 | 6·06 | 2 |
| 3265 | 5 1·3 | +36 55 | 137·0 | 14·63 | 9·0, 9·0 | 6·13 | 2 |
| 3266 | 5 1·5 | +36 52 | 61·7 | 8·05 | 9·0, 10·5 | 6·13 | 2 |
| 3272 | 5 13·2 | +39 14 | 342·9 | 18·86 | 7·7, 13·0 | 6·09 | 2 AB |
| | | | 296·4 | 27·31 | C= 13·3 | 6·11 | 3 AC |
| | | | 42·5 | 32·69 | D= 11·5 | 6·13 | 2 AD |
| 713 | 5 49·6 | +33 15 | 285·0 | 10·10 | 8·9, 9·0 | 6·92 | 2 |
| 380 | 6 2·8 | +34 29 | 21·8 | 18·67 | 9·0, 9·0 | 6·09 | 4 |
| 3282 | 6 20·8 | +38 10 | 313·7 | 15·89 | 9·0, 12·2 | 6·04 | 2 |
| 3284 | 6 39·8 | +36 17 | 84·8 | 5·42 | 10·2, 11·2 | 6·09 | 2 |

| h. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|
| 3285 | 6 46·2 | +38 15 | 252·6 | 11·11 | 9·6, 10·7 | 6·04 | 2 |
| 411 | 7 1·2 | +35 22 | 43·8 | 9·40 | ... | 6·11 | 2 |
| 757 | 7 16·2 | +34 27 | 105·9 | 5·28 | 9·8, 10·5 | 6·09 | 2 |
| 3294 | 7 27·5 | +35 51 | 178·0 | 4·81 | 9·4, 9·5 | 6·10 | 2 |
| 3295 | 7 31·3 | +39 5 | 15·5 | 22·75 | 8·5, 10·0 | 6·04 | 3 (Σ 1118 rej.) |
| 3301 | 7 43·8 | +37 28 | 61·3 | 23·47 | 7·7, 13·7 | 6·07 | 3 |
| 3303 | 7 49·3 | +35 46 | 34·3 | 12·05 | 9·4, 11·5 | 6·11 | 2 |
| 3305 | 7 54·4 | +37 9 | 229·0 | 4·39 | 9·0, 9·0 | 6·06 | 2 |
| 772 | 7 55·3 | +35 43 | 58·5 | 12·32 | 9·7, 13·0 | 6·14 | 1 |
| 436 | 7 57·1 | +35 16 | 80·5 | 12·18 | 9·5, 11·5 | 6·11 | 2 |
| 3308 | 8 3·7 | +35 46 | 265·3 | 46·01 | 6·2, 10·0 | 6·19 | 2 |
| 793 | 8 34·3 | +35 29 | 254·1 | 10·25 | 9·0, 10·0 | 6·12 | 2 |
| 2483 | 9 5·6 | +36 32 | 193·9 | 15·19 | 9·0, 10·0 | 6·11 | 3 |
| 2491 | 9 10·6 | +34 56 | 200·4 | 14·21 | 10·2, 10·3 | 6·10 | 3 |
| 2493 | 9 13·7 | +34 9 | 157·4 | 9·97 | 10·1, 11·7 | 6·14 | 2 |
| 462 | 9 17·2 | +30 34 | 7·5 | 18·01 | 9·3, 9·6 | 6·27 | 2 |
| 463 | 9 17·5 | +30 40 | 347·5 | 24·41 | 9·1, 10·5 | 6·27 | 2 |
| 815 | 9 24·0 | +33 20 | 144·5 | 13·98 | 8·9, 13·0 | 6·24 | 3 |
| 2509 | 9 46·8 | +37 41 | 68·5 | 14·02 | ... | 6·25 | 2 |
| 471 | 9 49·9 | +31 9 | 311·9 | 10·45 | ... | 6·28 | 1 |
| 3318 | 9 57·7 | +36 44 | 339·3 | 23·97 | 9·1, 9·5 | 6·14 | 2 |
| 475 | 10 3·1 | +32 6 | 172·4 | 27·63 | 6·7, 14·0 | 6·27 | 2 |
| 2531 | 10 22·5 | +40 43 | 2·6 | 8·74 | 8·9, 9·3 | 6·14 | 3 |
| 2532 | 10 23·7 | +38 29 | 248·2 | 12·64 | 9·0, 9·0 | 6·11 | 2 |
| 482 | 10 26·2 | +32 54 | 243·4 | 40·96 | 6·0, 12·0 | 6·27 | 2 |
| 483 | 10 26·3 | +32 42 | 133·5 | 15·34 | 8·8, 10·8 | 6·27 | 2 |
| 2555 | 10 57·7 | +39 7 | 45·2 | 11·22 | 10·0, 11·5 | 6·19 | 2 |
| 493* | 10 58·2 | +33 25 | 327·7 | 17·18 | 9·3, 10·8 | 6·27 | 2 |
| 499 | 11 22·8 | +36 52 | 254·0 | 39·59 | 8·5, 11·7 | 6·23 | 3 |
| 500 | 11 26·5 | +36 25 | 26·7 | 24·10 | 9·1, 9·2 | 6·23 | 3 |
| 502 | 11 28·3 | +37 35 | 219·0 | 12·42 | 9·3, 12·0 | 6·21 | 2 |
| 506* | 11 33·5 | +39 45 | 143·5 | 28·38 | 7·0, 14·0 | 6·32 | 1 |
| 510 | 11 45·0 | +38 16 | 251·7 | 24·86 | 9·6, 9·8 | 6·28 | 2 |
| 844* | 12 3·1 | +33 29 | 331·3 | 11·55 | 9·0, 10·0 | 6·30 | 1 |
| 2600 | 12 6·2 | +33 50 | 341·5 | 11·41 | 9·9, 10·2 | 6·31 | 2 |
| 523 | 12 47·1 | +35 19 | 183·3 | 14·41 | 9·1, 9·2 | 6·27 | 2 |
| 524 | 12 47·7 | +32 28 | 288·9 | 17·87 | 9·2, 11·0 | 6·29 | 3 |
| 528 | 13 10·4 | +40 16 | 179·9 | 18·75 | 9·1, 10·9 | 6·29 | 2 |
| 2681 | 13 42·3 | +33 37 | 262·9 | 13·61 | 11·5, 12·0 | 6·28 | 2 |
| 587 | 14 36·3 | +37 42 | 298·4 | 16·32 | 8·5, 11·5 | 6·57 | 1 |
| 263 | 14 57·9 | +38 2 | 112·2 | 17·79 | 9·2, 11·5 | 6·60 | 2 |
| 1340 | 18 38·9 | +32 25 | 82·2 | 13·09 | 9·2, 11·6 | 6·57 | 1 |
| 1379 | 19 9·2 | +31 28 | 307·0 | 9·30 | 9·3, 11·2 | 6·69 | 2 |

| h. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|
| 1383 | 19 15·4 | +31 22 | 111·6 | 11·32 | 10·0, 10·0 | 6·64 | 3 |
| 1390 | 19 18·3 | +30 42 | 131·9 | 9·44 | 9·3, 14·0 | 6·66 | 2 BC (new) |
| | | | 100·9 | 16·94 | A= 9·0 | 6·66 | 2 AB |
| 1616 | 21 5·7 | +30 36 | 292·8 | 8·58 | 8·9, 9·7 | 6·65 | 3 |
| 1686 | 21 40·1 | +31 17 | 230·2 | 13·28 | 9·5, 10·1 | 6·59 | 2 |
| 1688* | 21 43·5 | +30 48 | 358·7 | 14·90 | 9·5, 11·0 | 6·69 | 2 |
| 1695 | 21 44·2 | +30 47 | 116·1 | 13·07 | 9·0, 11·0 | 6·69 | 2 |
| 1707 | 21 52·0 | +31 28 | 331·4 | 8·41 | 9·3, 11·0 | 6·67 | 2 |
| 1722 | 22 1·3 | +31 26 | 45·7 | 16·72 | 8·9, 9·9 | 6·64 | 2 |
| 966 | 22 30·4 | +30 17 | 268·3 | 13·27 | 7·0, 11·0 | 6·68 | 3 AB |
| | | | 276·0 | 36·84 | C= 12·0 | 6·66 | 2 AC |
| 972 | 22 48·1 | +31 8 | 193·9 | 23·99 | 8·8, 10·0 | 6·76 | 2 |
| 1834 | 22 53·3 | +29 50 | 165·9 | 25·56 | ... | 6·77 | 2 |
| | | | 4·2 | 27·94 | C= 13·0 | 6·78 | 2 (new) |
| | | | 270·2 | 58·21 | ... | 6·78 | 3 |
| 1837 | 22 54·7 | +29 33 | 349·4 | 19·06 | 8·6, 12·2 | 6·80 | 2 |
| 1839 | 22 55·8 | +40 35 | 294·9 | 13·58 | 8·9, 10·3 | 5·96 | 2 |
| 1858 | 23 9·5 | +29 11 | 84·1 | 24·88 | 8·9, 11·2 | 6·74 | 2 |
| 1859 | 23 9·5 | +29 18 | 121·3 | 34·57 | 7·0, 10·5 | 6·74 | 2 |
| 1862 | 23 10·9 | +26 56 | 233·9 | 16·79 | 8·5, 10·0 | 6·81 | 1 |

*Various Stars.*

| Name. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|
| S 386 ... | 0 26·9 | +27 57 | 196·6 | 42·02 | 8·8, 8·9 | 6·78 | 3 |
| $\eta$ Cassiopeiæ... | 0 41·3 | +57 17 | 233·8 | 5·68 | ... | 6·08 | 3 |
| Washburn 6... | 1 30·2 | +32 31 | 105·8 | 2·33 | 9·0, 9·0 | 6·07 | 4 |
| B.D. +29°·330 | 1 50·7 | +29 58 | 306·4 | ,53·18 | 8·2, 9·2 | 6·86 | 2 |
| B.D. +30°·303 | 1 51·3 | +30 32 | 270·7 | 66·50 | 7·6, 9·0 | 6·89 | 2 |
| Σ 187 rej. ... | 1 51·8 | +31 5 | 180·2 | 13·05 | 8·6, 11·0 | 6·81 | 2 |
| 15 Trianguli | 2 29·7 | +34 15 | 17·1 | 138·80 | 5·5, 7·0 | 6·91 | 1 |
| Σ 568 rej. ... | 4 31·5 | +39 17 | 213·0 | 21·50 | 8·0, 11·0 | 5·02 | 1 |
| Σ 594 rej. ... | 4 42·5 | +39 5 | 335·0 | 7·86 | 8·5, 10·0 | 6·03 | 1 |
| S 484 ... | 5 22·8 | +33 25 | 170·7 | 59·20 | ... | 6·91 | 1 |
| Σ 842 rej. ... | 6 2·1 | +36 32 | 18·0 | 29·08 | 8·2, 9·6 | 6·55 | 2 |
| Σ 1139 rej. ... | 7 41·8 | +37 21 | 6·9 | 15·95 | 8·6, 9·1 | 6·06 | 2 |
| Σ 1294 rej. ... | 8 51·1 | +33 18 | 339·7 | 15·01 | 8·5, 9·0 | 6·08 | 2 |
| Σ 1411 rej. ... | 10 3·4 | +32 50 | 306·7 | 35·11 | 9·0, 9·4 | 6·08 | 1 |
| Σ 1492 rej. ... | 10 52·1 | +31 12 | 164·7 | 21·53 | 7·8, 9·7 | 6·29 | 2 |
| Σ 1610 rej. ... | 12 6·6 | +39 21 | 330·5 | 28·93 | 7·9, 9·2 | 5·81 | 2 |
| Σ 1739 rej. ... | 13 16·9 | +31 1 | 130·7 | 12·37 | 9·2, 10·0 | 6·31 | 2 |
| Σ 1749 rej. ... | 13 24·3 | +31 35 | 350·0 | 20·51 | 8·5, 10·0 | 6·30 | 1 |
| Σ 2295 ... | 18 8·6 | +31 32 | 171·7 | 9·62 | 8·5, 9·0 | 6·65 | 2 |

| Name. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|
| A.G.C. ... | 18 15·6 | +29 52 | 172·3 | 17·91 | 9·0, 9·4 | 6·71 | 2 |
| Σ 2359 rej. ... | 18 34·7 | +30 42 | 291·5 | 22·55 | 8·8, 12·0 | 6·65 | 1 |
| A.G.C. ... | 19 57·9 | +31 23 | 355·8 | 12·15 | 8·3, 8·9 | 6·61 | 1 |
| Ho 588 ... | 20 12·9 | +31 12 | 15·8 | 8·19 | 8·8, 13·5 | 6·64 | 2 BC |
| | | | 297·4 | 51·34 | A = 6·5 | 6·64 | 2 AB |
| A 1218 ... | 21 19·1 | +30 50 | 22·2 | 3·57 | 8·5, 9·7 | 6·65 | 2 |
| Küstner 66 ... | 22 50·2 | +32 32 | 1·3 | 3·52 | ... | 6·88 | 3 |
| Σ 2975 rej. ... | 23 1·6 | +32 29 | 288·5 | 29·95 | 9·0, 9·0 | 6·92 | 2 |

*Notes.*

*h* 5450 *h* has no description.

*h* 629 The only other measures are those of HΣ:—

| | ° | ″ | |
|---|---|---|---|
| AB | 71·45 | 10·92 | 1885·83 |
| AC | 74·15 | 71·35, | ,, |

*h* 636 The only other measures are mine:—

| ° | ″ | | |
|---|---|---|---|
| 287·5 | 20·08 | 2n | 1904·78 |

*h* 3272 The only other measures are by *β*:—

| | ° | ″ | | |
|---|---|---|---|---|
| AB | 341·7 | 19·58 | 2n | 1879·86 |
| AC | 295·0 | 29·36 | 2n | ,, |
| AD | 42·7 | 33·48 | | |

*h* 493 *h*'s place $1^m$ too small. There is a third star more distant in the same direction.

*h* 506 *h*'s dec. should be increased 1°.

*h* 844 Not found; star here given is BD + 33°·2192, preceding *h*'s place by $3^m$ $10^s$.

*h* 1390 The faint *comes* C is too difficult to measure satisfactorily.

*h* 1688 No star in this place. The star here given is BD + 30°·4529, which is $2^m$ following *h*'s place.

*h* 966 *h*'s observation was made when it was cloudy, and the primary was consequently underrated and the third star missed. The third star was seen but not measured by HΣ. The only measures of AB are those of HΣ:—

| ° | ″ | |
|---|---|---|
| 268·90 | 13·13 | 1885·76 |

*Various Stars.*

15 Trianguli A, strong orange red; B, very blue.

## *New Double Stars.* By Rev. T. E. Espin.

| No. | B.D. | R.A. 1900. h m | Decl. 1900. ° ′ | P. ° | D. ″ | Mags. | Date. 1900+. | Nights. |
|---|---|---|---|---|---|---|---|---|
| 312 | ... | 0 12·0 | +34 35 | 237·3 | 2·15 | 9·6 10·0 | 6·95 | 2 |
| 313 | +32·58 | 0 18·2 | +32 27 | 16·3 | 3·95 | 8·7 12·7 | 6·95 | 2 |
| 314 | +28·95 | 0 30·6 | +28 41 | 201·7 | 8·36 | 8·5 14·0 | 6·77 | 3 |
| 315 | +28·101 | 0 32·5 | +28 40 | 77·7 | 2·04 | 9·1 9·4 | 6·78 | 3 |
| 316 | +32·154 | 0 47·3 | +32 43 | 292·3 | 1·92 | 9·3 9·7 | 6·95 | 2 |
| 317 | ... | 0 54·9 | +31 56 | 187·1 | 6·59 | 9·2 9·4 | 6·71 | 2 |
| 318 | +30·223 | 1 21·0 | +30 55 | 71·0 | 2·72 | 9·5 11·0 | 6·71 | 2 |
| 319 | +32·256 | 1 22·9 | +33 2 | 290·7 | 1·75 | 9·3 9·8 | 6·95 | 1 |
| 320 | +33·310 | 1 46·5 | +33 25 | 161·2 | 1·87 | 8·5 9·5 | 6·95 | 2 AB |
| | | | | 259·8 | 9·95 | C=10·0 | 6·95 | 2 AC |
| 321 | +29·333 | 1 51·6 | +30 5 | 181·2 | 3·63 | 9·2 10·0 | 6·82 | 2 |
| 322 | +32·374 | 1 59·6 | +32 39 | 92·2 | 2·32 | 9·5 9·6 | 6·96 | 2 |
| 323 | +33·425 | 2 21·9 | +33 39 | 179·8 | 6·35 | 9·1 10·3 | 6·96 | 2 |
| 324 | +28·448 | 2 33·2 | +28 28 | 20·2 | 1·80 | 9·1 11·0 | 6·97 | 1 BC |
| | | | | 185·8 | 32·75 | A= 9·0 | 6·97 | 1 AB |
| 325 | +30·465 | 2 49·8 | +31 10 | 0·1 | 12·92 | 7·9 12·5 | 6·94 | 3 |
| 326 | +31·536 | 2 59·6 | +31 39 | 36·1 | 4·79 | 9·8 10·8 | 6·91 | 3 BC |
| | | | | 35·8 | 102·33 | A= 8·0 | 6·88 | 2 AB |
| 327 | +32·652 | 3 33·5 | +33 9 | 292·9 | 14·00 | 8·3 12·0 | 6·95 | 1 |
| 328 | +34·761 | 3 47·1 | +34 46 | 288·4 | 6·82 | 8·3 14·0 | 6·99 | 2 |
| 329 | +30·601 | 3 53·7 | +30 31 | 255·9 | 7·27 | 9·0 12·5 | 6·94 | 3 |
| 330 | +31·834 | 4 51·7 | +31 7 | 156·1 | 3·95 | 9·2 12·0 | 6·92 | 2 |
| 331 | +35·971 | 4 59·1 | +35 32 | 324·0 | 7·60 | 8·6 11·0 | 6·95 | 1 |
| 332 | +33·1017 | 5 14·8 | +33 17 | 210·1 | 14·65 | 8·3 8·5 | 6·95 | 2 |
| 333 | +31·936 | 5 15·2 | +31 22 | 36·7 | 3·37 | 9·2 9·3 | 6·92 | 2 |
| 334 | S 483 | 5 21·8 | +33 42 | 347·9 | 15·09 | 8·0 14·0 | 6·11 | 2 BC |
| | | | | 50·5 | 95·48 | A= 7·0 | 6·11 | 2 AB (S. 483) |
| 335 | +32·1012 | 5 23·9 | +32 34 | 330·6 | 2·65 | 9·1 9·2 | 6·95 | 1 |
| 336 | +31·1027 | 5 31·0 | +31 43 | 258·6 | 8·47 | 8·7 9·0 | 6·92 | 2 |
| 337 | +31·1191 | 5 49·0 | +33 13 | 296·7 | 5·45 | 9·1 12·0 | 6·92 | 2 |
| 338 | +36·1361 | 6 0·9 | +36 37 | 19·5 | 8·17 | 8·5 11·5 | 6·94 | 2 |
| 339 | +32·1460 | 6 54·8 | +32 33 | 186·7 | 16·40 | 6·5 13·0 | 7·04 | 2 |
| 340 | +31·1491 | 7 0·1 | +31 51 | 139·5 | 5·62 | 9·0 9·2 | 6·94 | 2 |
| 341 | +32·1522 | 7 13·0 | +32 37 | 251·6 | 3·05 | 9·0 9·0 | 6·95 | 1 |
| 342 | ... | 17 52·0 | +31 21 | 235·4 | 5·82 | 9·0 10·7 | 6·67 | 2 |
| 343 | +31·3133 | 17 52·7 | +31 12 | 282·8 | 8·46 | 9·0 11·7 | 6·69 | 2 |
| 344 | +33·2994 | 17 53·6 | +33 52 | 30·7 | 8·96 | 8·6 9·1 | 6·63 | 2 |